STUDY MODULE DESCRIPTION FORM

Name of the module/subject	Code
Modern technologies of quality of supply improvement	**1010312421010325653**

Field of study	Profile of study (general academic, practical)	Year /Semester
Power Engineering	**(brak)**	**1 / 2**
Elective path/specialty	**Subject offered in:**	**Course (compulsory, elective)**
-	**Polish**	**obligatory**

Cycle of study:	Form of study (full-time,part-time)
Second-cycle studies	**full-time**

No. of hours	No. of credits
Lecture: **15** Classes: **-** Laboratory: **15** Project/seminars: **-**	**2**

Status of the course in the study program (Basic, major, other)	(university-wide, from another field)
(brak)	**(brak)**

Education areas and fields of science and art	ECTS distribution (number and %)
technical sciences	**2 100%**
Technical sciences	**2 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	It has basic from the electrical engineering, the power engineering, the electronics and the power electronics
2	**Skills**	It knows to apply the knowledge from the range of the electrical engineering, the power engineering, the electronics and the power electronics
3	**Social competencies**	There has the consciousness of the necessity of extending of her competences, a readiness to the collection of the cooperation within the framework of the group

Assumptions and objectives of the course:

Theoretical knowledge of propriety and basic characteristics of power electronics systems to improvement of the quality and flexible transmission of electrical energy.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. to apply the knowledge on the subject constructions, operations and designings of power electronics systems in the power engineering - [K_W04 ++ K_W14 +++]
2. to characterize criteria of the analysis and synthesis for power electronics systems - [K_W04 ++]

Skills:

1. to use the knowledge within the range constructions and mechanisms of action of power electronics systems in the power engineering - [K_U03 ++]
2. to use known methods and mathematical models and computer simulations to the analysis and evaluation of operation of complex power electronics systems - [K_U02 ++ K_U11 ++]

Social competencies:

1. Has the consciousness of the importance and the understands different aspects and results of activity of electrician engineer in this of the influence on the medium, and related to this of the responsibility for undertaken decisions - [K_K01 ++]

Assessment methods of study outcomes

Lecture

? the credit of the lecture preceded with the credit of occupations laboratory exercises and project,

Designing work and laboratory exercises:

? the test and awarding the knowledge of need-to-know to realization of placed problems

in the given area of tasks,

? verification skills on every exercises

? evaluation of the knowledge and skills related to the realization of laboratory exercise, the evaluation of the report from done exercises.

Obtaining additional points for activity during exercises, in particular way for:

? proposing to discuss additional aspects of the subject

? effective use of knowledge obtained during solving of given problem;

? comments related to improve teaching material,

? aesthetics of solved problems and reports ? within homework.

Course description

The general characteristics of issues of the quality of the feed - goals and tasks. Chosen issues of the compatibility of receivers of the electrical energy. Traditional methods of the improvement of quality of the feed. Active and hybrid series and shunt filters. Methods of identification of filtered currents and voltage component. Drivers of active filtration systems. Unified Power Flow Controller UPFC. Interline Power Flow Controller IPFC. Flexible reliable intelligent electrical energy delivery system.

Basic bibliography:

1. Krykowski K., Energoelektronika, Wydawnictwo Politechniki Śląskiej, Gliwice 2002.

2. Piróg S., Energoelektronika. Negatywne oddziaływanie układów energoelektronicznych na źródła energii i wybrane sposoby ich ograniczania. Uczelniane Wydawnictwa Naukowo-Dydaktyczne AGH, Kraków 1998.

3. Strzelecki R., Supronowicz H., Filtracja wyższych harmonicznych w sieciach prądu przemiennego, Wydawnictwo Adam Marszałek, Toruń 1998.

4. Strzelecki R., Supronowicz H., Współczynnik mocy w systemach zasilania prądu przemiennego i metody jego poprawy, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2000.

5. Tunia H., Smirnow A., Nowak M., Barlik R., Układy energoelektroniczne. Obliczanie, modelowanie, projektowanie, WNT, Warszawa 1990.

Additional bibliography:

1. Dmowski A.: Regulacja napięć przemiennych. Układy wybrane. WNT, Warszawa 1983.

2. Dmowski A.: Energoelektroniczne układy zasilania prądem stałym. WNT, Warszawa 1998.

3. Nowak M., Barlik R.: Poradnik inżyniera energoelektronika. WNT, Warszawa 1998

Result of average student's workload

Activity	Time (working hours)
1. participation in the lectures	15
2. participation in the laboratory exercises	15
3. participation in consultations on the lecture	5
4. participation in consultations on the laboratory exercises	10
5. preparation for the laboratory exercises	10
6. preparation for the exam	10
7. preparation for the laboratory exercises pass	10
8. participation in the exam	5

Student's workload

Source of workload	hours	ECTS
Total workload	80	2
Contact hours	30	1
Practical activities	10	1